

107096



附件-

MAGNETIC CRITERIA...

...multiple product grades and complex flux patterns are available with the use of Plastiform magnets.

POLE CONFIGURATION...

whether single pole or double pole or even alternating multipole on a single sheet, 3M Company can provide the exact configuration for your specifications.

FLUX PATTERNS...

with minimum reluctance in the magnetic circuit can be custom designed by 3M Company to meet critical tolerance requirements.

ENERGY...

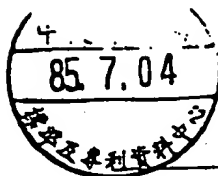
the ferrite particles in Plastiform magnets are highly oriented during processing to provide magnetic properties equal to, or superior to conventional isotropic ferrite magnets. This formulation decreases the chance of demagnetization or flux pattern changes during handling and operation.

	UNITS 1: CGS-U.S. units 2: SI (MKSA) units	PLASTIFORM		
		(PL-1)	(PL-1H)	(PL-1.4H)
MAGNETIC PROPERTIES (typical)				
Maximum energy product (at 23°C) ($B_d H_d$ max.)	gauss x oersteds $\times 10^4$ teslas x amp. turn/m $\times 10^3$	1.08 8.57	1.10 8.73	1.4 11.1
Residual induction ¹ (at 23°C) (Br)	gauss millitesla	2150 215	2150 215	2450 245
Coercive Force ¹ (at 23°C) (Hc)	oersteds ampere-turns/cm	1650 1315	1940 1545	2200 1950
Coercive Force intrinsic ¹ (at 23°C) (Hci)	oersteds ampere-turns/cm	2150 1710	3000 2385	3000 2385
Incremental permeability (at 23°C)	ratio	1.08	1.08	1.04
Thermal coefficient of magnetization (-40 to 120°C)	% per °F % per °C	0.105 0.19	0.105 0.19	0.105 0.19
Thermal coefficient of intrinsic coercive force (-40 to 120°C)	% per °F % per °C	0.12 0.22	0.07 0.13	0.07 0.13
Peak magnetizing force required	oersteds ampere-turns/cm	10000 8000	10000 8000	10000 8000

TEST METHODS: 1-Pole-coil Hysteresisgraph

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	UNITS CGS-U.S. units SI (MKSA) units	PLASTIFORM VALUES
PHYSICAL PROPERTIES (typical)		
Density ¹ (at 23°C)	lbs/in ³ gm/cm ³	0.134 3.71
Hardness ² (at 23°C)	Shore D	55
Tensile strength ³ (at 23°C)	psi N/cm ²	640 440
Flexibility ⁴ (at 23°C)	180° bending on mandrel with O.D. equal to 7X sample thickness	Pass
Volume resistivity ⁵ (at 23°C and 50% R.H.)	ohm-cm	10 ¹⁶
Dielectric Strength ⁶ (at 23°C and 50% R.H.)	volts/mil kV/mm	250 10
Thermal coefficient of thickness expansion (4 to 120°C)	mil/mil per °F cm/cm per °C	9.8 x 10 ⁻⁵ 18 x 10 ⁻⁵
Maximum continuous operating temperature	°F °C	250 120

TEST METHODS: 2. ASTM D-297 5. 3M Test Method

3. ASTM D-2240

6. ASTM D-257

4. ASTM D-412

7. ASTM D-149

Typical Chemical Resistance (Nitrile Rubber Binder)

* All values shown are averages and not intended for specification purposes.
Specification values will be provided upon request.

** Good — minor or no effect; up to 10% swell in thickness.

Fair — moderate effect; 10-25% swell in thickness.

Poor — severe effect; greater than 25% swell in thickness.

Chemical (7 days immersion @ RT)	Performance**
Motor Oil	Good
Transmission Oil	Good
Hydraulic Fluid	Good
Kerosene	Good
JP-4 Fuel	Fair
Gasoline	Fair
Heptane	Fair
Antifreeze	Good
Clorox	Good
Turpentine	Good
Water	Good
Detergents	Good
Salt Spray	Good
Aromatic Hydrocarbons (Benzene, Toluene, Xylene)	Poor
Chlorinated Hydrocarbons (Carbon Tetrachloride, Trichloro- ethylene)	Poor
Ketones	Poor
Alcohols	Fair
Acids, Inorganic (HCl, H ₂ SO ₄)	Poor

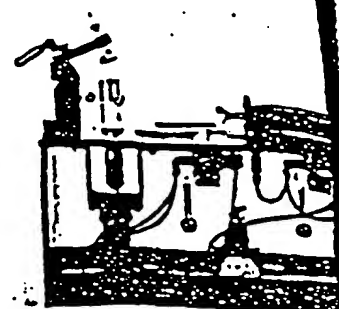
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Applications Continued....



The magnetizer-inserter equipment shown to the right illustrates the principles of automated production using Plastiform Brand magnets. These principles are easily applied to modern manufacturing processes and are designed to save production time and drastically reduce rejection rates without sacrificing performance. The magnetizer-inserter and other application equipment can be fabricated by a machine builder, or in the manufacturer's own tooling department. 3M Company's Customer Engineering Service is available to provide the technical assistance necessary to get such equipment built and into operation.



A widely recognized advantage Plastiform material is its adaptability to automated magnetization-in-

Typical Physical Properties @ 23°C (73°F)

* All values shown are typical and not for specification purposes.
* B-1013 and B-1030 are lubrication type and extra-flexible type respectively.

Property	Value*	Units 1. CGS/U.S. 2. SI (MKSA)	
Density ¹ 密度	1. 0.134 lbs/in ³ 2. 3.71 gm/cm ³		
Hardness ² 硬度	55 Shore D 30-35 D		
Tensile Strength ³ 抗拉强度	1. 640 PSI 2. 440 N/cm ²		
Elongation ⁴ (B-1030 only) 伸張度	18%		
Flexibility ⁵ (B-1030 only) 柔軟度	Pass — 180° bending on mandrel equal to 7 x sample thickness		
Volume Resistivity ⁶ (50% R.H.)	10 ¹⁸ Ohm-cm		
Dielectric Strength ⁷ (50% R.H.)	1. 250 volts/mil 2. 10 Kv/mm		
Thermal Coefficient of Thickness Expansion (4° to 120° C)	1. 9.8 x 10 ⁻⁶ mil/mil per °F 2. 18 x 10 ⁻⁶ cm/cm per °C		
Maximum Continuous Operating Temperature	1. 250 °F 2. 120 °C		

体積電阻(靜電)
硬度
厚度方向膨脹係數
連續使用溫度上限

Test Methods

- ASTM D-297
- ASTM D-2240 (10 sec. delay)
- ASTM D-412

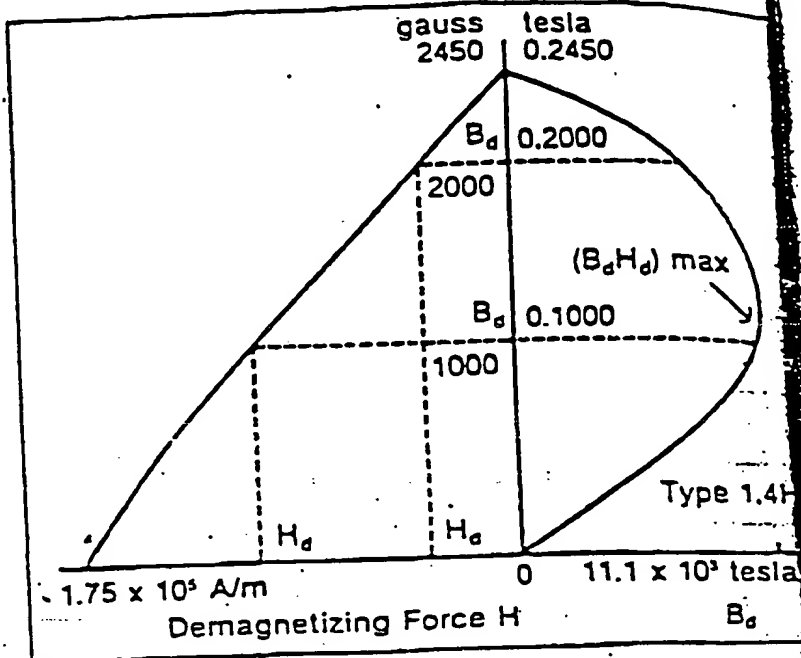
- 3M Test Method
- ASTM D-257
- ASTM D-149

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Determination of Typical BH
max.

*All values shown are averages and not intended for specification purposes.
Specification values will be provided upon request.



(宝器7.1.27元)

Typical Chemical Resistance
(Nitrile Rubber Binder)

*All values shown are averages and not intended for specification purposes.
Specification values will be provided upon request

** Good — minor or no effect; up to 10% swell in thickness
Fair — moderate effect; 10-25% swell in thickness
Poor — severe effect; greater than 25% swell in thickness

Chemical (7 days Immersion @ RT)	Performance**
Motor Oil 机油	Good
Transmission Oil 润滑油	Good
Hydraulic Fluid 液压油	Good
Kerosene 煤油	Good
JP-4 Fuel 航空燃料	Fair
Gasoline 汽油	Fair
Heptane 庚烷	Fair
Antifreeze 防冻剂	Good
Clorox 漂白剂	Good
Turpentine 松节油	Good
Water 水	Good
Detergents 清洁剂	Good
Salt Spray 盐雾	Good
Aromatic Hydrocarbons (Benzene, Toluene, Xylene) 芳香族碳氢化合物	Poor
Chlorinated Hydrocarbons (Carbon Tetrachloride, Trichloroethylene) 氯化碳氢化合物	Poor
Ketones 酮类	Poor
Alcohols 酒精	Fair
Acids, Inorganic (HCl, H ₂ SO ₄)	Poor

宝器7.1.27元

Acetylene

T04070-29828T60

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Typical Magnetic Properties @ 23°C (73°F)

*All values shown are typical and are not intended for specification purposes.
*B-1013 and B-1030 are fabrication type and extra-flexible type respectively.



(2区) 磁化溫度係數
(2区) 固有係磁力量度係數

所需交變磁化力

Property	Value*	Units 1. CGS/U.S. 2. SI(MKSA)
Maximum Energy Product ($B_r H_c$ max)	1. 1.4×10^4 gauss x oersteds 2. 11.1×10^3 teslas x amp turns/m	
Residual Induction' (B_r) 殘留磁感應度	1. 2450 gauss 2. 245 milliteslas	
Coercive Force' (H_c) 矯頑磁力量	1. 2200 oersteds 2. 1750 ampere turns/cm	
Coercive Force, Intrinsic' (H_{ci}) 固有係磁力量	1. 3000 oersteds 2. 2385 ampere turns/cm	
Incremental Permeability	1.04 ratio	
Thermal Coefficient of Magnetization (Reversible)	1. -0.105% per °F 2. -0.19% per °C	
Thermal Coefficient of Intrinsic Coercive Force (Reversible)	1. 0.07% per °F 2. 0.13% per °C	
Peak Magnetizing Force Required	1. 10,000 oersteds 2. 8000 ampere turns/cm	

Test Methods

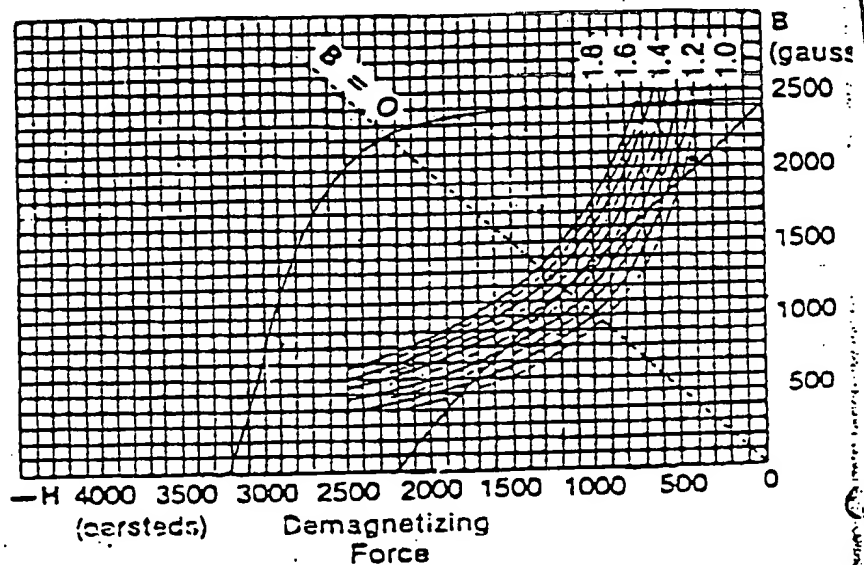
*Pole-coil Hysteresigraph

Typical Demagnetization Curve @ 23°C (73°F)

*All values shown are averages and not intended for specification purposes. Specification values will be provided upon request.

PL-1.4H
B_r 2450 gauss
H_c 2200 oer.
H_{ci} 3250 oer.
BH max $1.40 \text{ G.O.} \times 10^4$

Typical Demagnetization Curve



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工業材料研究所編譯資料

資料來源：電波新聞 74.9.12 23.24.25 版
資料分類：市場—金屬



資料來源：電波新聞 74.9.12 23.24.25 版
日期：74年11月5日 (MR 74-140)

資料分類：市場—金屬

題：塑膠磁鐵之技術動向與未來

表 1 塑膠磁鐵之特性

項目	單位	Ferrite			土類				
		FJ-15	FJ-17	FJ-20	LS-40	LJ-60	LJ-80	LJ-100	LJ-120
磁化率		2.3-2.5	2.5-2.7	2.7-2.9	3.0-4.0	4.3-5.3	5.3-6.1	6.1-6.7	6.7-7.3
剩磁		1.6-2.2	2.0-2.4	2.0-2.5	2.5-3.5	3.2-3.8	3.8-4.2	4.0-4.4	4.4-5.3
磁滯回線		2.5-3.5	2.5-3.5	2.6-3.5	>5.0	>5.0	>5.0	>5.0	>5.5
磁化率		1.2-1.5	1.5-1.7	1.7-2.0	2.5-3.5	4.0-6.0	6.0-8.0	8.0-10.0	10.0-12.0
磁化率		1.0-1.2	1.0-1.2	1.0-1.2	1.0-1.2	1.0-1.2	1.0-1.2	1.0-1.2	1.0-1.2
磁化率		-0.18	-0.18	-0.18	-0.05	-0.05	-0.05	-0.05	-0.05
比		3.5-3.7	3.5-3.7	3.5-3.7	5.0-5.5	5.0-5.5	5.0-5.5	5.0-5.5	5.3-5.8
比		100-120	100-120	100-120	30-40	60-70	60-70	60-70	60-70
比		(Resistivity 11.8)	(Resistivity 11.8)	(Resistivity 11.8)	(Resistivity 11.8)	(Resistivity 11.8)	(Resistivity 11.8)	(Resistivity 11.8)	(Resistivity 11.8)
比		100-700	600-700	600-700	30-50	200-300	200-300	200-300	150-250
比		1100-1200	1100-1200	1100-1200	—	600-700	600-700	600-700	—
比		10 ⁻⁴ -10 ⁻⁵	10 ⁻⁴ -10 ⁻⁵	10 ⁻⁴ -10 ⁻⁵	10 ⁻⁴ -10 ⁻⁵	10 ⁻⁴ -10 ⁻⁵	10 ⁻⁴ -10 ⁻⁵	10 ⁻⁴ -10 ⁻⁵	10 ⁻⁴ -10 ⁻⁵
比		10 ⁻⁴ -10 ⁻⁵	10 ⁻⁴ -10 ⁻⁵	10 ⁻⁴ -10 ⁻⁵	—	—	—	—	—
比		150	150	150	100	120	120	120	120
比		polyamide 系	polyamide 系	polyamide 系	polyamide 系	polyamide 系	polyamide 系	polyamide 系	polyamide 系
比		片 出	片 出	片 出	Roll	片 出	片 出	片 出	片 出

① FJ-15, 17, 20

② LS-40, LJ-60, 80, 100

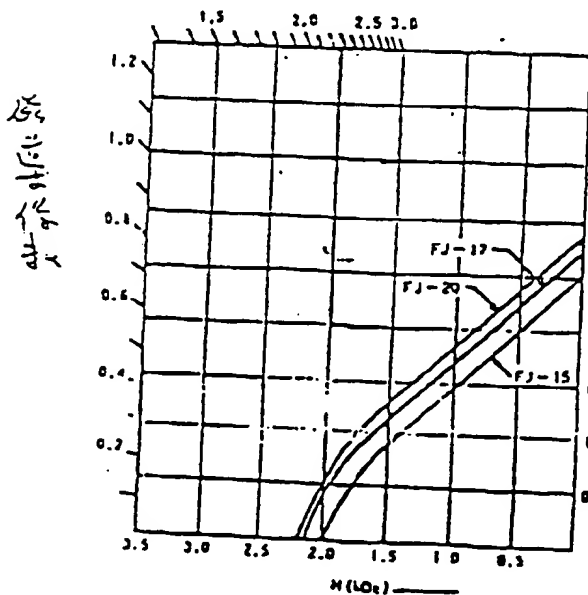


圖 2 ferrite 系塑膠磁鐵退磁曲線 (代表)

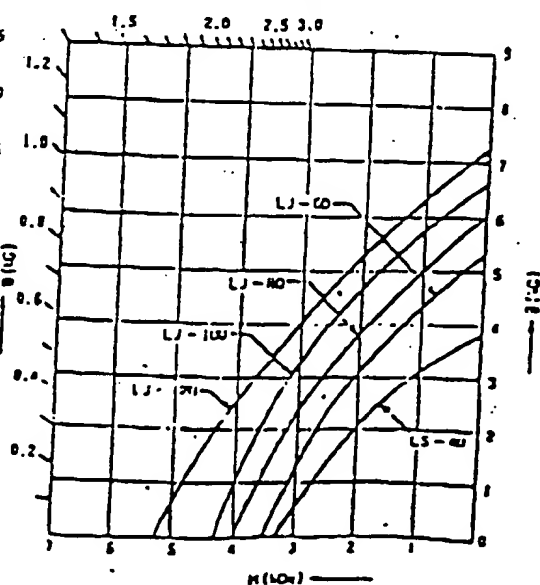


圖 3 柝土類系塑膠磁鐵退磁曲線 (代表)

107036 ヘラマックス磁石 インジェクションタイプ

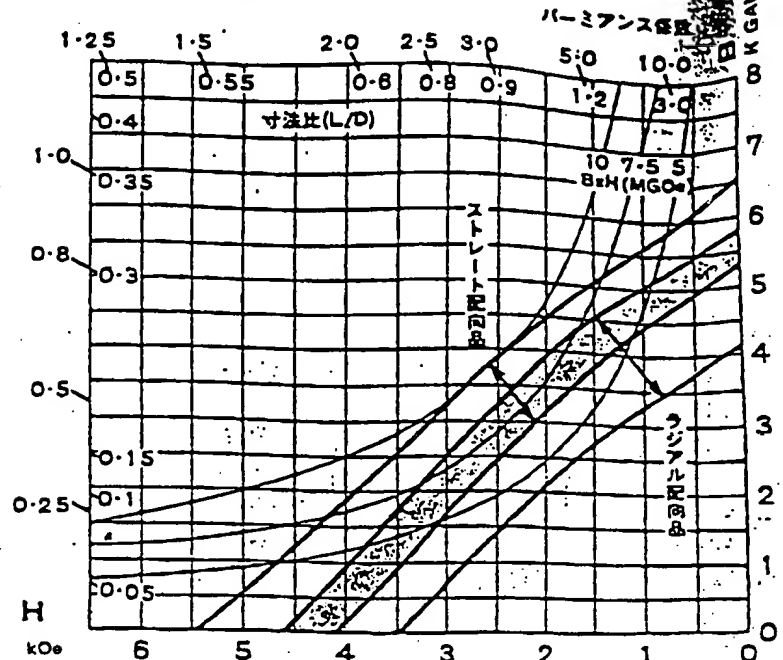
1479三

■特長

- 軽く、われにくく、特殊形状のものも容易に製造できます。
- 精密成形ができます。(寸法精度±0.03%以下)
- インサート・アットサート成形等、他の部材との一体成形が可能です。
- ラジアル配向・多極磁磁も可能です。
- 通常の工作機械で容易に加工できます。
- 適合歯距の選択により、フレキシブルタイプもあります。



■減磁特性曲線



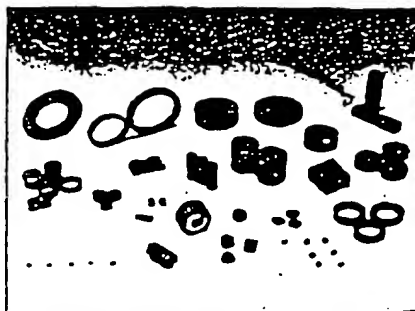
■磁気的特性・物理的特性

	記号	単位	ラジアル配向品 	ストレート配向品
最大エネルギー積	$(B \cdot H)_{max}$	MGOe	4~8	6~10
残留磁束密度	B_r	G	4,200~5,900	5,300~6,600
保磁力	B_{Hc}	Oe	3,500~4,600	4,200~5,400
固有保磁力	$2H_c$	Oe	>8,000	>8,000
B_r の温度係数		%°C	-0.035	-0.035
使用温度範囲		°C	-40~150	-40~150
密度	d	g/cm ³	5.5~5.7	5.8~5.9
硬度	H_{Rock}	Rスケール	100~120	100~120

■用途

小型化、軽量化、高性能化が要求される分野に最適です。

- 回転磁石(各種小型モーター、小型発電機等)
- 計測・通信機器(センサー、リレー、スイッチ、メーター等)
- 音響機器(スピーカー、マイクロホン、ピックアップ、イヤホン等)
- 応用磁石(マグネットカップリング、磁気機器、装飾品、電子ロック、玩具等)



■サンプルをご希望の場合

- 切削加工用材料は豊富にとりそろえてあり即納いたします。
(詳細はサンプル表をご参照下さい。)

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NAKANO PERMALLOY

CLASSES AND PROPERTIES

NAKANO PERMALLOYS are nickel iron alloys which meet the requirements of miniaturized, electromagnetic devices.

You can get a strong magnetic flux through weak electric current.

NAKANO PERMALLOYS are suitable for several shaping. They are well blanked, well drawn, well bent, well welded and well rolled to thin sheets. Whatever shape it may be, you can make it from NAKANO PERMALLOYS. Thin sheets make it possible to diminish eddy current and to miniaturize devices.

NAKANO PERMALLOYS are available in any shape you want. Send us the drawing of a component and you will get it made of Permalloy already heat treated.

NAKANO PERMALLOYS are prepared in accordance with JIS. Our products are based on Japan Industrial Standard c 2531. We can supply uniform alloys in production quantities and at any time you want. Besides the standard products, we produce a number of special grade for unusual applications.

NAKANO PERMALLOYS are used for such devices as transformers for telecommunication, taperecorder heads and shields, light and sensitive relays, solenoid cores, several types of magnetic shield and detectors in ground fault circuit interrupters.

Remark. About shielding, more informations are offered from page 3 to 5.

Table 1. Thickness and Tolerances of Sheets and Strips

Unit : mm			
Thickness	Tolerance on thickness	Thickness	Tolerance on thickness
0.05	±0.005	0.35	±0.02
0.1	±0.01	0.5	±0.03
0.2	±0.015	1.0	±0.05

Table 3. Magnetic Characteristics of PB

Magnetic Characteristics		Initial Permeability μ_i	Maximum Permeability μ_m	Coercive force H_c (Oe)	Saturation flux density B_{10} (G)	Residual flux density B_r (G)	resistivity ρ ($\Omega \cdot \text{cm}$)
PB	NAKANO PERMALLOY	3000—5000	25000—70000	0.15max.	14500—15500	8000max.	45min.
	J I S	3000min.	30000min.	0.20max.	14000min.	—	45min.

Remarks μ_i is the initial permeability at the field strength 0.01 Oe.
 H_c is the coercive force when magnetized at 10 Oe and reversed.
 B_r is the residual magnetic flux when magnetized at 10 Oe and reversed.
 B_{10} is the value for informative reference.

Table 4. Effective Permeabilities of PB

Class	Thickness (mm)	Effective Permeability μ_e	μ_e 0.2KHz	μ_e 1KHz
PB	0.2	NAKANO PERMALLOY	4000—4500	3000—5000
		J I S	3000min.	2400min.
	0.35	NAKANO PERMALLOY	3500—4000	2300—3000
		J I S	3000min.	2700min.

"PB" is 45% nickel iron alloy with the biggest saturation induction among the Permalloys.

It costs less than PC and mainly used for transform for telecommunication, choke coil cores, sensitive relays, solenoid cores, D.C. incremented transformers and devices in alternative current equipments.

"PD" is 36% nickel iron alloy with slightly lower magnetic properties, but it offers the highest electric resistivity of $1 \mu\Omega \cdot \text{cm}$ among the Permalloys. PD is mainly used for transformers for relatively high frequencies.

"PC" is 78% nickel iron molybdenum alloy. It is the most effective material for sensitive and miniaturized electronic devices, because of its highest permeability, the lowest coercive force and the smallest core loss.

PC's thin sheets are profusely used for taperecorder heads, transformers of high grade and several shielding devices required extremely weak magnetic field.

"PCS" is called supermalloy which has the permeability about twice as much as normal PC, and its coercive force is under 0.01 Oe. PCS is usually used for the spiral wound tape core in a ground fault circuit interrupter.

Table 2. Classes and Nominal Components

class	Nominal Component	Remarks
PB	N40—50% Fe removed	45 Permalloy
PC	N70—80% including other special components	78 Permalloy
PD	N130—40% Fe removed	36 Permalloy

Fig. 1. A Hysteresis Curve of PC

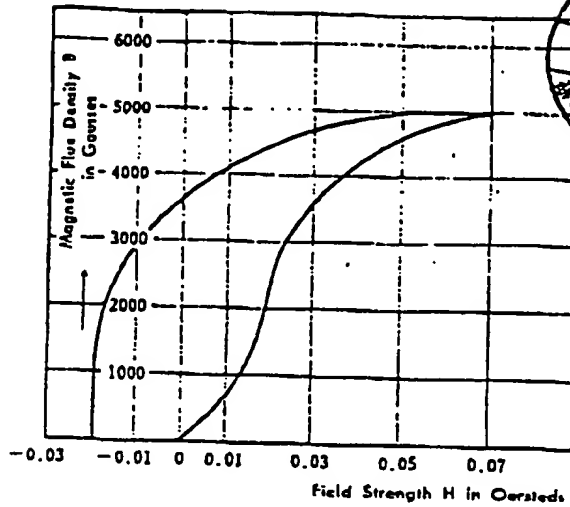


Fig. 2. A Hysteresis Curve of PB

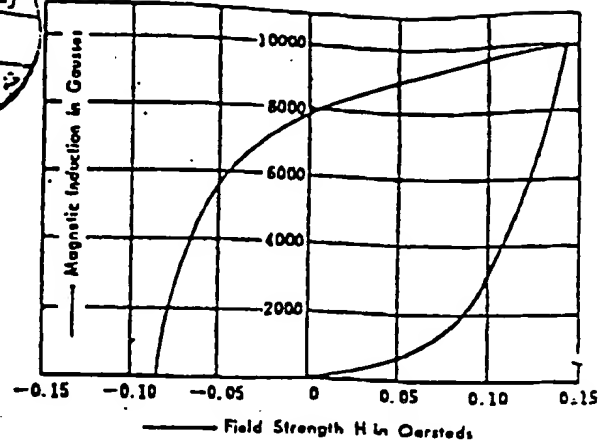


Table 5. Magnetic Characteristics of PC

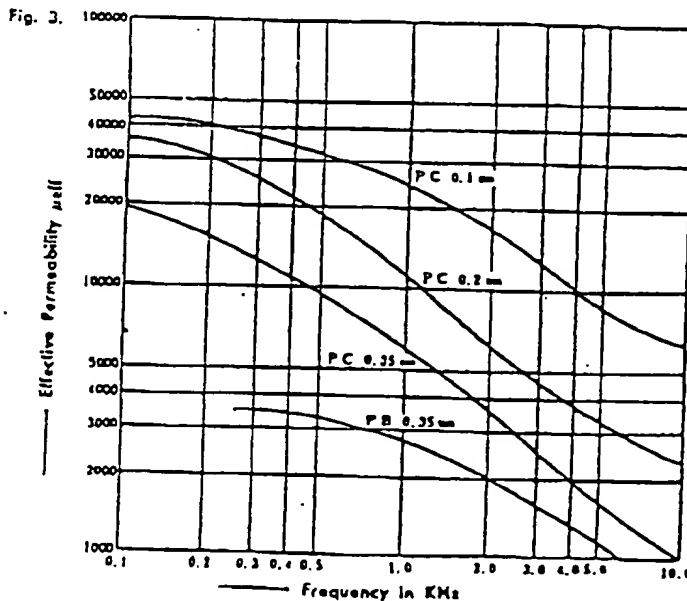
Class	Magnetic Characteristics	Initial Permeability μ_i	Maximum Permeability μ_m	Coercive force H_c (Oe)	Saturation flux density B_{10} (G)	Residual flux density B_r (G)	resistivity $\mu\Omega\cdot\text{cm}$
PC	NAKANO PERMALLOY	40000—150000	120000—300000	0.020max.	6500	4000max.	55min.
	J I S	25000min.	100000min.	0.025max.	6500min.	—	55min.

- Remarks 1. μ_i is the initial permeability at the field strength 0.005 Oe.
 2. H_c is the coercive force when magnetized at 10 Oe and reversed.
 3. B_{10} is the saturation flux density when magnetized at 10 Oe and reversed.
 4. B_r is the value for informative reference.

Table 6. Effective Permeabilities of PC

Class	Thickness (mm)	Effective Permeability μ_e	μ_e 0.3 KHz	μ_e 1 KHz	μ_e 3 KHz
PC	0.1	NAKANO PERMALLOY J I S	—	25000—35000 20000min.	10000—16000 9000min.
	0.2	NAKANO PERMALLOY J I S	25000—35000 20000min.	10000—13000 8000min.	—
	0.35	NAKANO PERMALLOY J I S	12000—15000 10000min.	5500—7500 4000min.	—

Remark. Measuring current is 0.5 mA



Specimen: Ring core
 outside diameter 45mm
 inside diameter 33mm

Annealing: In hydrogen atmosphere
 1100°C × 2hr.

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附件 2

FLEXIBLE WIDE SHEET MAGNETS

THE ULTIMATE IN VERSATILITY!

PROPERTIES/APPLICATIONS

Flexible Magnetic Sheets are being used for signs, displays, visual aids, toys, games, premiums, magnetic business cards, bulletin boards, indoor and outdoor advertising boards and many other applications. No matter what size or shape you use, the entire surface is magnetic and flexible. It will conform to smooth contours. Since you can cut Flexible Magnetic Sheet with ordinary knives, scissors or dies, you need not worry about expensive cutting equipment.

Consult us concerning any custom requirements you may have. Special thickness, width and colors are available with quantity usage.

Cat. No.	Dimensions	Standard Colors
8220	.020 x 24"	Plain brown/adhesive
8221	.020 x 24"	Plain brown/adhesive
8222	.020 x 24"	Semi-gloss white
8223	.020 x 24"	Semi-gloss white
8320	.030 x 24"	Plain brown
8321	.030 x 24"	Plain brown
8322	.030 x 24"	Matte white
8323	.030 x 24"	Matte white
8324	.030 x 24"	High-gloss white
8620	.060 x 24"	Plain brown

- Available with or without vinyl-facing with or without pressure sensitive backing.
- All dimensions in inches
- Typical magnetic strength on bare metal is 55 lbs. per sq. ft. for .030 thickness and 35 lbs. for .020 thickness.
- Shipped 24" wide by length
- Full 100 ft. roll may contain up to three sections, none less than 20 ft. long

CAN BE USED WITH
ENAMEL, VINYL AND POLYESTER SILK SCREEN
INKS -- CAN ALSO BE LETTERED WITH BULLETIN AND
LETTERING ENAMELS. THE FULL MAGNETIC SHEET
WITH VINYL FACING IS BEING USED
EXTENSIVELY FOR
MAGNETIC SIGNS.

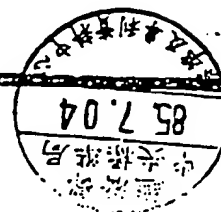
Typical Properties

MATERIAL	RESIDUAL FLUX DENSITY BR (GAUSS)	COERCIVE FORCE Hc (OERSTEDS)	MAXIMUM ENERGY PRODUCT BH _{max} (MGOe)	MAXIMUM PRACTICAL OPERATING TEMPERATURE (*C)/(*F)	TEMPERATURE COEFFICIENT (% LOSS/*C)	DENSITY (LBS/CUBIC INCH)
FLEXIBLE REGULAR	1600	1370	0.6	120/248	.19	.133
FLEXIBLE HIGH FORCE	2100	1370	1.1	120/248	.19	.140

CUT
WITH
SCISSORS
OR
KNIFE

- Other thicknesses available
- Higher maximum energy product available

magnet
SALES & MFG. CO.



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● 磁相成 (CONTENTS) :

係由永久磁鐵，係以磁鐵混合和磁化合物
(BARIUM FERRITE COMPOSITE) 而
成之永久性磁石。

● 特性表 (CHARACTERIZATION)

磁 氣 特 性 Characterization	異方性	等方性
最大能 B_H (BH) max. $\times 10$	1.1	0.6A
殘留磁通密度 (Br) gauss	2200	1650
剩磁場力 (Hc) oersteds	1900	1300
固有保磁力 (Hci) oersteds	2400	2400
磁化溫度係數 (δ/ρ)	-0.1	-0.1
固有保磁力之溫度係數 (δ/ρ)	0.1	
比 阻 (ρ/cm^2)	3.9	3.9

◎ 吸引力之計算

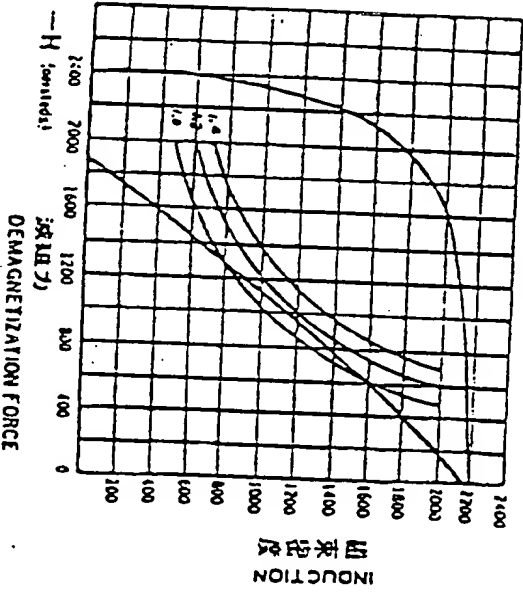
$$F (\text{dyne}) = a \cdot B^2 / 8\pi$$

* a 磁鐵表面積
B 磁通密度 (G)
1 g 980 (dyne)

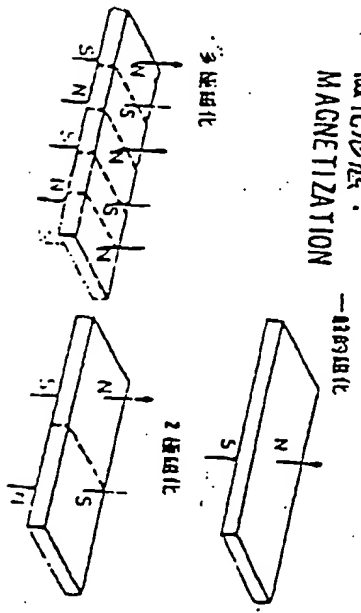
● 減磁特性曲線

(DEMAGNETIZATION CURVE)

異方性



磁化形態：
MAGNETIZATION



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申請日期	76.9.16
申請號碼	76.20904.1
類別	G02C

(以上各欄由本局填註)

發明
專利
證書

經濟部
中央標準局
85.7.04
107096
發明專利證書

發明專利說明書

(VI)

<p>一、發明名稱</p>	<p>帶有磁性之眼鏡框及無框眼鏡片</p>		
<p>二、發明人</p>	<p>姓名 陳環昌</p> <p>籍貫 (國籍) 中華民國</p> <p>住居所 中和市景平路六六九號十一樓之九</p>		
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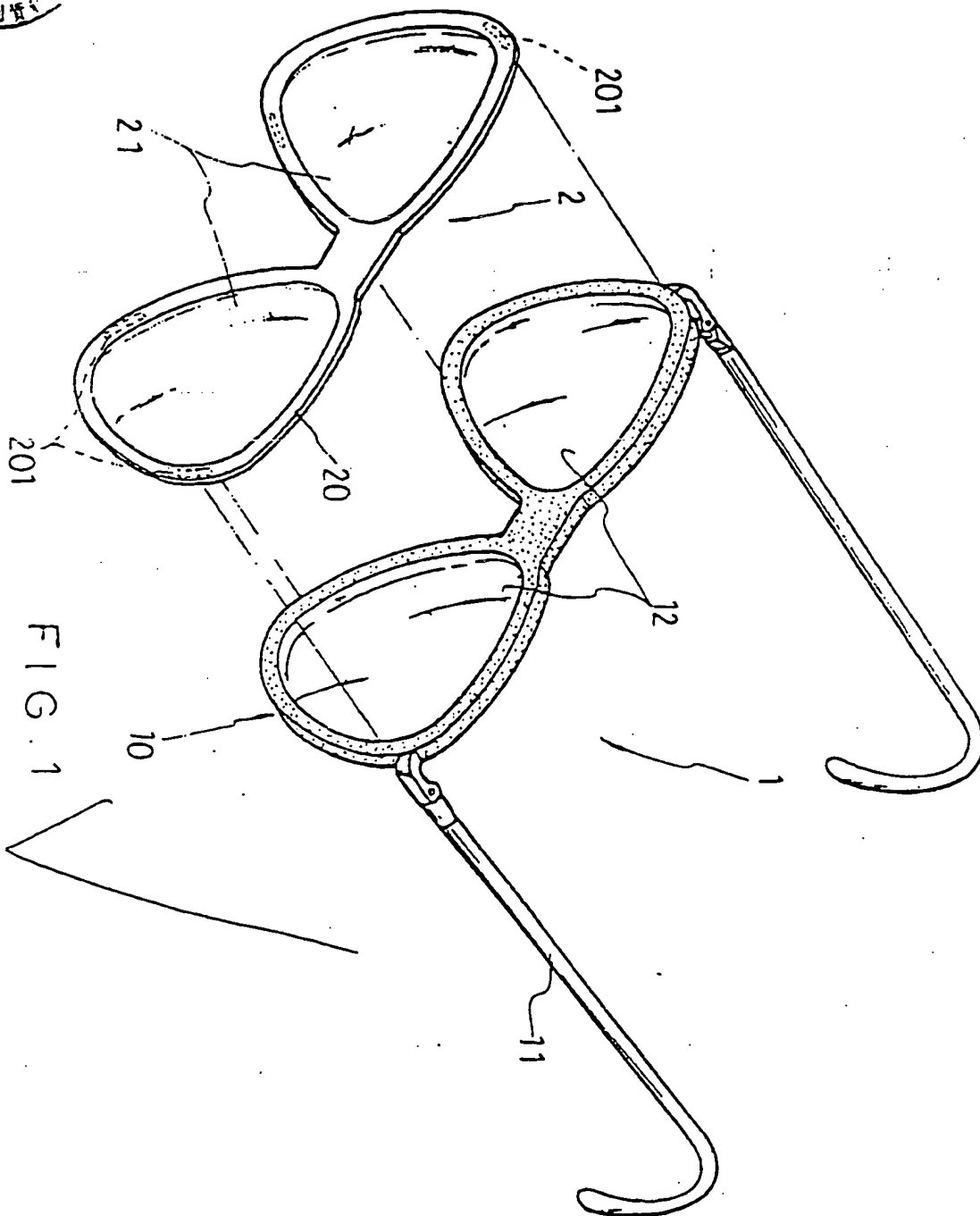
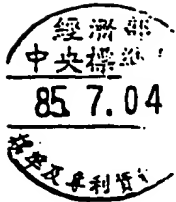
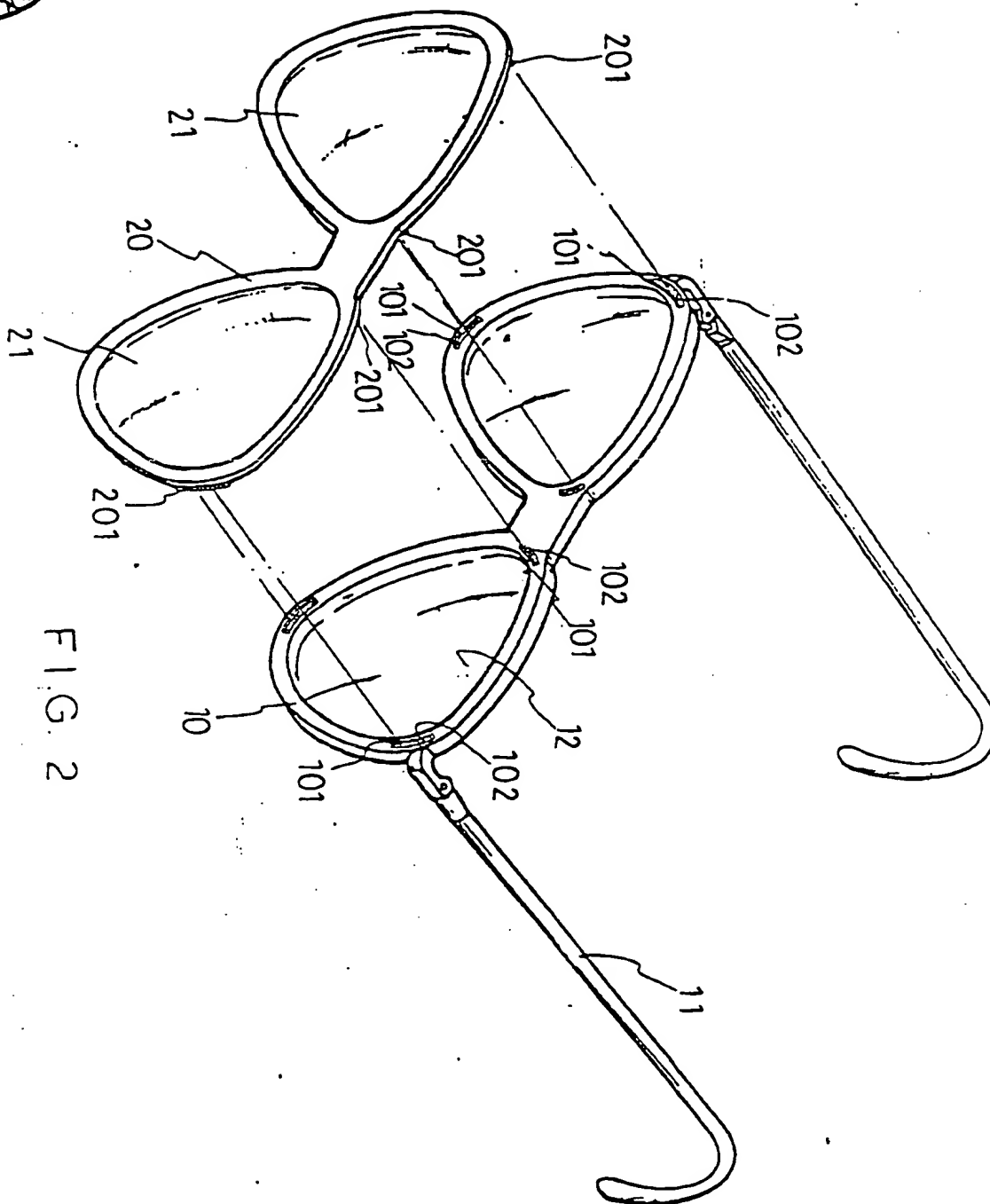
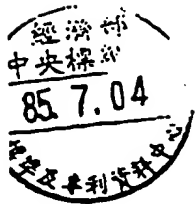


FIG. 1

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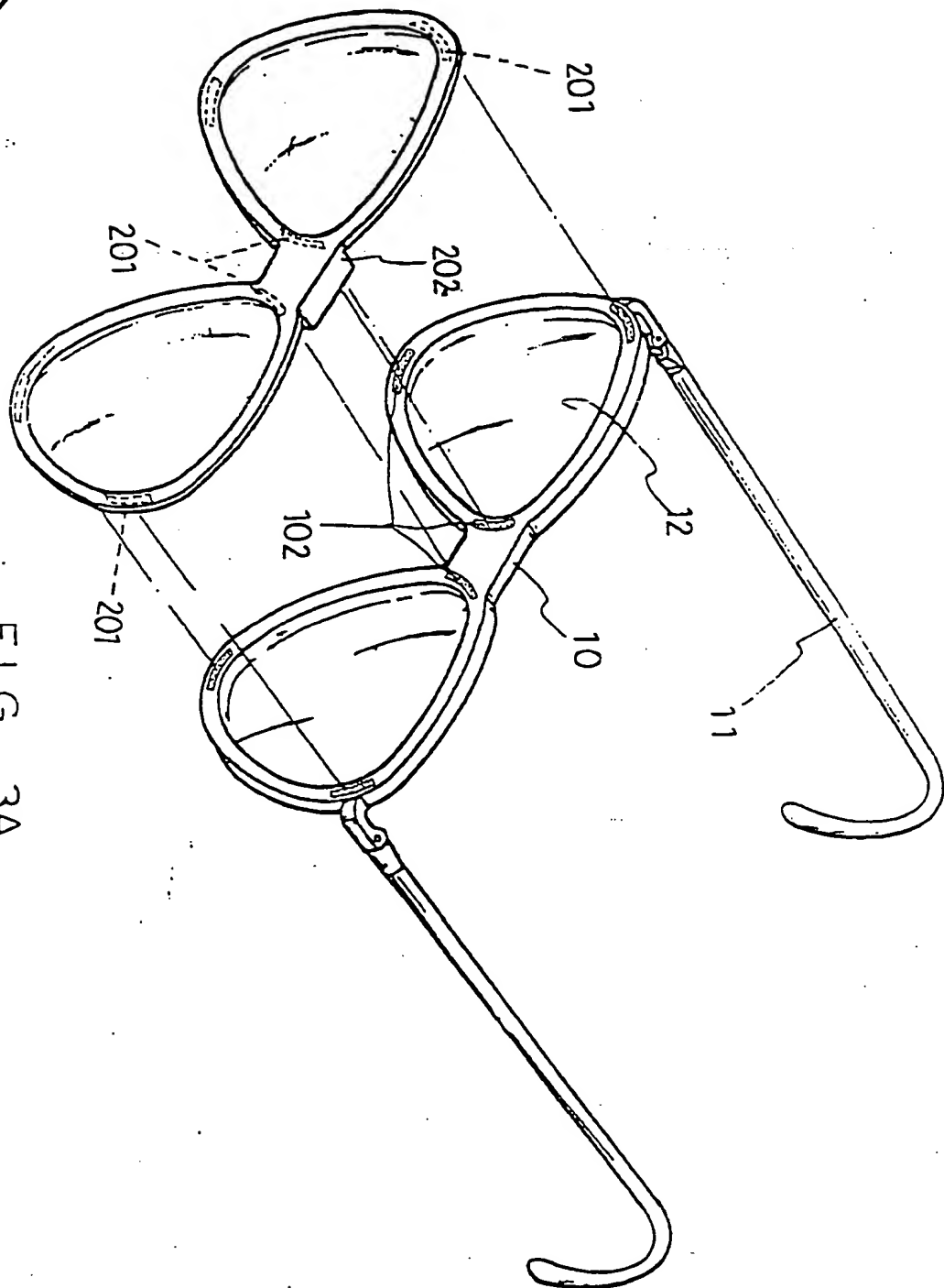


FIG. 3A

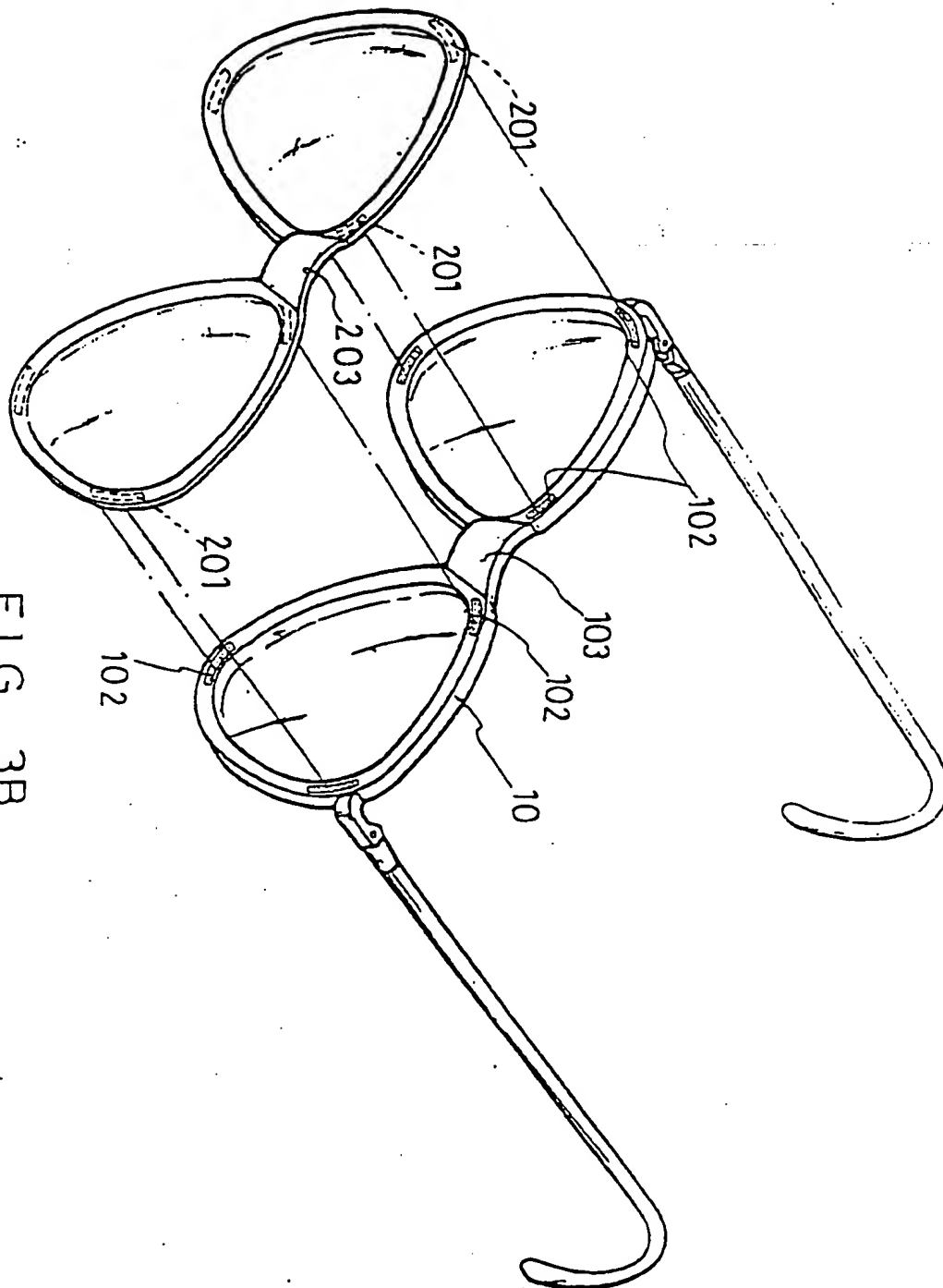
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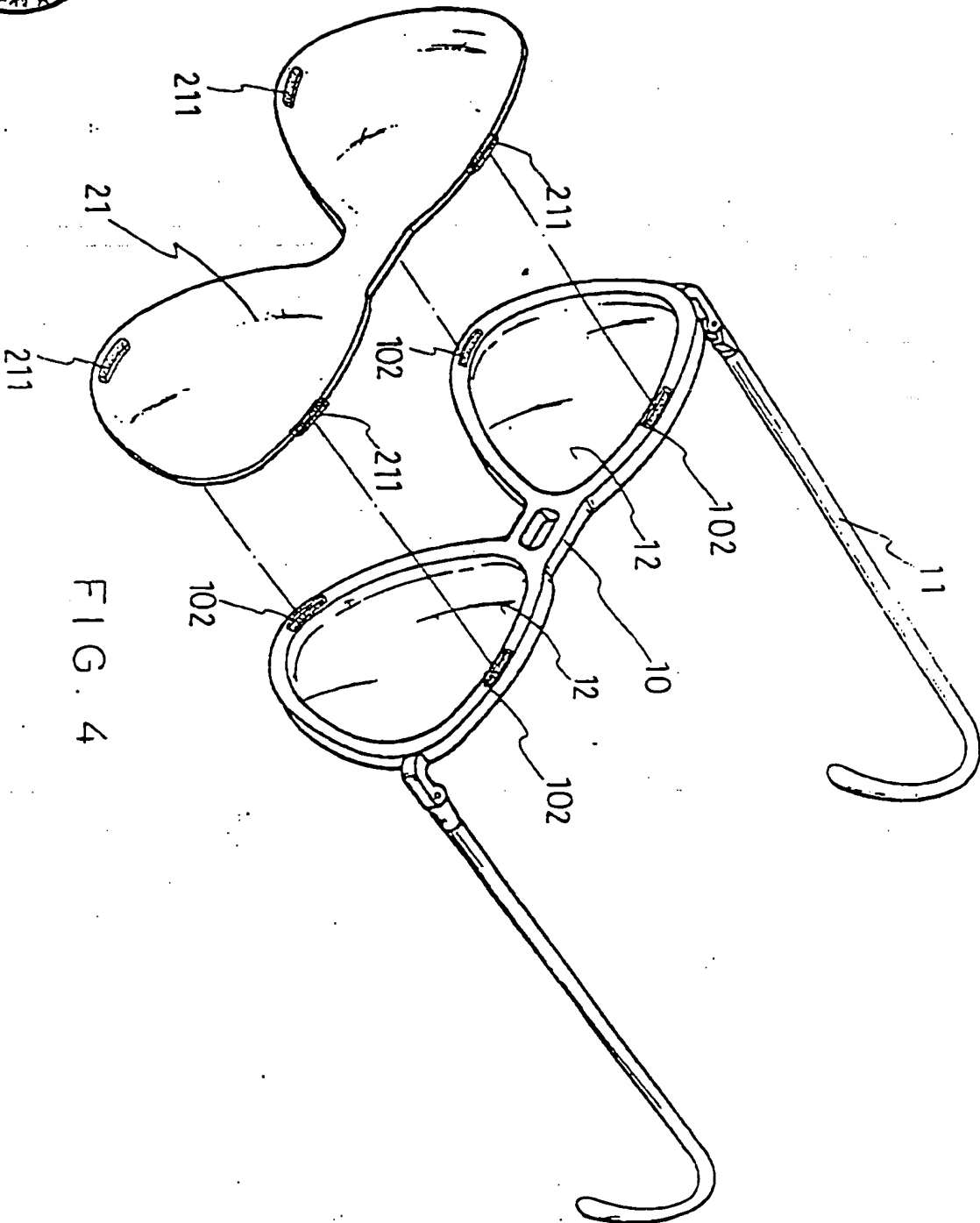


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FIG. 3B



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